WHAT IS CLAIMED IS:

1. A method for providing contention free transmission during a contention period in a shared communications medium comprising:

(1) capturing the shared communications medium;

(2) permitting a recipient to transmit; and

(3) recapturing the shared communications medium after the recipient transmits.

2. The method of claim 1, further comprises the step of (0) waiting for the shared communications medium to become idle prior to capturing the shared communications medium.

3. The method of claim 1, wherein the capturing step comprises a hybrid controller transmitting a frame.

4. The method of claim 3, wherein the frame is transmitted prior to the expiration of a point coordination function (PCF) interframe space (PIFS) period after the shared communications medium becomes idle.

5. The method of claim 3, wherein the frame is transmitted prior to the expiration of a short interframe space (SIFS) period after the shared communications medium becomes idle.

6. The method of claim 3, wherein the frame is a data frame.

7. The method of claim 3, wherein the frame is a control frame.

8. The method of claim 3, wherein the frame is a combination data and control frame.

9. The method of claim 3, further comprising the step of (8) repeating steps (1)-(3) after the shared communications medium has been idle for a PIFS period.

10. The method of claim 7, wherein the shared communications medium is shared by a plurality of stations, and wherein the control frame contains a duration specifying how long the recipient can transmit, and wherein the recipient may transmit frames to any station as long as the recipient can complete the transmission within the duration specified by the control frame.

11. The method of claim 10, wherein a station receiving a frame from the recipient may transmit frames to any station as long as the station can complete the transmission within the duration specified by the control frame.

12. The method of claim 11, wherein if a station receiving a frame has previously received a frame within the duration specified by the control frame, then the data transmission terminates, even if sufficient time remains in the duration specified by the control frame to transmit additional frames.

13. The method of claim 1, wherein the permitting step comprises:

transmitting a frame by the recipient; and

transmitting a frame by a hybrid controller.

14. The method of claim 13, wherein there are multiple traffic categories, and wherein the recipient may transmit a frame from any traffic category as long as the recipient can transmit the frame within a duration specified by a control frame.

15. The method of claim 13, wherein there are multiple traffic categories, and wherein the recipient may transmit multiple data frames of traffic from

any traffic category as long as the recipient can transmit the frame within a duration specified by a control frame.

16. The method of claim 13, wherein the hybrid controller may begin transmitting a frame one SIFS period after the recipient finishes transmitting.

17. The method of claim 1, wherein the shared communications medium is shared by a plurality of recipients, and the method further comprises the step of repeating steps (2)-(3) until each recipient has transmitted all of its frames.

18. The method of claim 1, further comprising the step of repeating steps (2)-(3) until the contention period ends.

19. The method of claim 1, wherein the shared communications medium is shared by a plurality of recipients, and further comprising the step of (4) transmitting control frames to a second recipient after a first recipient has finished transmitting, even if the first recipient has additional frames to transmit.

20. The method of claim 19, further comprising the step of (5) repeating steps (2)-(4) until each recipient has transmitted all of its frames.

21. The method of claim 1, wherein a station becomes a recipient by sending a control frame to a hybrid controller.

22. The method of claim 21, wherein upon receipt of the control frame from the station, the hybrid controller places the station into a list of recipients.

23. The method of claim 1, further comprises the step of (6) releasing the communications medium after the contention-free transmission ends.

24. The method of claim 1, further comprises the step of (7) transmitting frames using contention access after the contention-free transmission ends.

25. The method of claim 24, wherein a hybrid controller coordinates the contention access by updating and broadcasting contention access parameters for use by contenting stations in contention communications.

26. The method of claim 25, wherein the updating and broadcasting are performed at fixed time intervals.

27. The method of claim 25, wherein the updating and broadcasting are performed when specific network performance metrics fall outside specified ranges.

28. A centralized controller comprising:

a memory;

a processor coupled to the memory, the processor containing circuitry to manage contention-free access to a communications medium, the processor further comprises:

a list processor to maintain a list of stations desiring contention-free communications;

a scheduler to arrange the serving order of the stations in the list of stations desiring contention-free communications;

a contention coordinator to update contention access parameters for use by contending stations in contention communications;

the centralized controller further comprises:

a transmit/receive unit coupled to the processor, the transmit/receive unit to transmit and receive data frames from the communications medium; and

a medium sensor unit coupled to the processor, the medium sensor to detect a state of the communications medium.

29. The centralized controller of claim 28, wherein the medium sensor unit is internal to the transmit/receive unit.

29. The centralized controller of claim 28, wherein the medium sensor outputs the state of the communications medium to a memory location in the centralized controller.

30. The centralized controller of claim 28, wherein the medium sensor asserts a medium status flag depending on the state of the communications medium.

31. The centralized controller of claim 28, wherein the scheduler arranges the order of serving the stations in a first come first served basis.

32. The centralized controller of claim 28, wherein the scheduler arranges the order of serving the stations in a list ordered by traffic category.

33. The centralized controller of claim 28, wherein the contention coordinator updates the values of contention access parameters for contention communications.

34. A communications network comprising:

a communications medium;

at least one station, coupled to the communications medium, the communications station capable of communicating with other stations;

a centralized controller, coupled to the communications medium, the centralized controller for managing communications during a contention-free communications period, the centralized controller further comprises:

a memory;

a processor coupled to the memory, the processor containing circuitry to manage contention-free access to a communications medium;

a transmit/receive unit coupled to the processor, the transmit/receive unit to transmit and receive data frames from the communications medium; and

a medium sensor unit coupled to the processor, the medium sensor to detect a state of the communications medium.

35. The communications network of claim 34, wherein the processor further comprises:

a list processor to maintain a list of stations desiring contention-free communications;

a scheduler to arrange the serving order of the stations in the list of stations desiring contention-free communications; and

a contention coordinator to update contention access parameters for use by contending stations in contention communications.

36. The communications network of claim 34, wherein the communications medium is radio frequency spectrum.

37. The communications network of claim 34, wherein the centralized controller is internal to a communications station.